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New Stag-beetles of the Genus *Prismognathus* from Southwestern Japan (Coleoptera, Lucanidae)

By

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黒沢良彦*：西南日本産オニクワガタ属の新種及び新亜種

It is not useless to reexamine well-known insects. Because of thorough familiarity, we are apt to consider that those species are doubtless unique. The stag-beetles of the genus *Prismognathus* MOTSCHULSKY, 1860, occurring in Japan are the good examples of this case. From the Island of Yakushima, lying off the southern end of Kyûshû, Japan, a '*P. angularis*' was known already before the World War II, but the exact record of this stag-beetle was first made in 1958 by Mr. K. TSUKAMOTO. However, he did not give the accurate collecting data of his specimen. The first exact data of '*P. angularis*' captured in Yakushima was published quite recently in 1972 by Mr. K. SAKAMOTO, who also illustrated for the first time a male specimen taken in this island. In 1972 and 1974, Mr. Toku WATANABE captured three males of *Prismognathus* in Yakushima. Based upon these specimens I became aware that the stag-beetle was a new species apparently different from true *P. angularis* WATERHOUSE, 1874, from Japan proper.

After that time, through the courtesy of Dr. Katsura MORIMOTO, I could examine a series of specimens of a stag-beetle of the same genus collected from a decayed wood at Mt. Aoi-dake (563 m), Miyazaki Pref., southern Kyûshû, Japan, and came to the conclusion that they belonged to a new subspecies of *P. angularis* WATERHOUSE.

In the following lines, I am going to describe these two new forms in comparison with typical *P. angularis* WATERHOUSE from Japan proper and to discuss the origin of the Japanese forms of the genus *Prismognathus*.

In the course of this study, I was given invaluable aid from Mr. Toku WATANABE of Sendai City, Mr. Keisuke TSUJI of Tokyo, Dr. Shun-Ichi UÉNO of the National Science Museum, Tokyo, Mr. Mutsuo MIYATAKE of Ehime University, Matsuyama, Prof. Yoshihiro HIRASHIMA of Kyushu University, Fukuoka, and Dr. Katsura MORIMOTO of the Kyûshû Branch of the Government Forest Experiment Station, Kumamoto, in various ways. I must express my sincere gratitude for the kindness of those entomologists.

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Prismognathus tokui sp. nov.

Prismognathus angularis: TSUKAMOTO, 1958, Akitu, Kyoto, 7, p. 13; SAKAMOTO, 1972, Satsuma, 21, p. 69.

Male. Body black to castaneous, somewhat lustrous, with legs and antennae concolorous with the body above, and somewhat robuster than that of *P. angularis*.

Head a little larger than that of *angularis*, about twice as broad as long, widest in front, scattered with small, round, and variolate punctures, which are a little larger than those of *angularis*, not confluent with one another, and become smaller and sparser towards vertex and frons; genae not produced, more sharply and distinctly edged just behind the eyes than in *angularis*, causing the part just below each gena broadly depressed; eyes not so large and prominent than in *angularis* and divided by ocular ridge in the anterior two-fifths; clypeus subtriangular, narrowly rounded at the tip; ridge just inferior to each eye distinct and a little more sharply edged than in *angularis*; canthus subrectangular before each eye and always slightly produced beyond eye, while in *angularis*, it is not so remarkably produced as in this species. Mandibles arcuate in the maximum type and ⌜-shaped in the minor type, leaving between them a large subovate space in any case, while in *angularis*, this space usually forms a ⍥-shape; dentations at the inferior side irregular, small, except for the basal tooth which is large and strongly produced, five to six in number between the basal one and the tip, sometimes partly conjunct with each other, but not largely emarginate and unarmed just before the basal dentation as in *angularis*; outer margin arcuate or almost straight in dorsal aspect, but not sinuate as in *angularis*; tip strongly and perpendicularly bent inferiorly, strongly, sharply prolonged and pointed, and distinctly longer than the erect process at the apex.

Pronotum about 1.8 times as broad as the median length, and widest in front; sides subparallel or feebly approximate posteriorly, but not attenuate anteriorly as in *angularis*; anterior margin broadly emarginate, with the median lobe obsoletely produced; anterior angles produced, but blunt at the tip; posterior margin narrowly reflexed, and slightly sinuate on each side; posterior angles slightly but distinctly produced and angulate or rarely sharply pointed, with the outer margin of the angle distinctly emarginate, while, in *angularis*, these are broadly obtuse or rounded with the outer margin sinuate; disk with the median line slightly but distinctly impressed and with a small, obsolete, irregular-sized depression on each side of the median line, but sometimes it becomes obsolete and almost effaced; surface covered sparsely and coarsely with small, round, variolate punctures, which are larger and more distinct than in *angularis*. Scutellum lingulate, sparsely and irregularly punctured.

Elytra about 1.3 times as long as wide, about equal in width to or slightly wider than the maximum width of pronotum, and widest at the middle or just behind the middle; sides slightly expanded from humeri to the middle, where they are slightly arcuate, then arcuately attenuate to round apex; lateral margins distinctly reflexed; surface scattered with very fine punctures, with the intervals smooth, and some recognizable traces of striae, while, in *angularis*, intervals are microscopically imbricate and the striae are hardly recognizable.

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Legs normal, not different from those of *angularis*.

Length: 16–20 mm (without mandibles), 19–25 mm (with mandibles); width: 7.5–8.5 mm.

Female. Body black, somewhat lustrous.

Head coarsely and irregularly punctate, but the punctuation is coarser, denser than in *angularis*, and the punctures are also larger than those of *angularis*; canthus more distinctly angulate before eye than in *angularis*; mandibles with the apical teeth more strongly produced and prolonged and sharper than in *angularis*.

Pronotum rather obliquely attenuate from the basal third to the anterior angles, which are narrower than in *angularis*; anterior margin with the median lobe feebly arcuate and less produced than in *angularis*; lateral margins distinctly reflexed, very obsoletely, irregularly and feebly crenulate; posterior angles subrectangular, very distinct, and distinctly and more strongly emarginate just before the angle than in *angularis*; surface more strongly punctate than in *angularis*.

Elytra shorter and more ovate than in *angularis*, and widest just behind the middle; sides slightly expanded laterally behind the middle, where they are arcuate; surface distinctly but finely striated and finely punctured, while, in *angularis*, the striae are very obsolete and irregular, sometimes almost vanished, and the punctures are finer than in this new species.

Length: 26.6 mm (without mandibles), 28.0 mm (with mandibles); width: 7.2 mm.

Holotype (♂): Hananoégô, Yakushima I., 28. vii. 1974, T. WATANABE lgt.

Allotype (♀): Shichigo-dake, Yakushima I., 6. viii. 1970, M. TÔYAMA lgt.

Paratypes: 1♂, Shikanosawa, Yakushima I., 30. vii. 1974, T. WATANABE lgt.; 1♂, Top of Mt. Miyanoura-dake, Yakushima I., 6. viii. 1970, M. TÔYAMA lgt.; 1♂, Shiratani, Yakushima I., 5. ix. 1972, T. WATANABE lgt.; 1♂, Kosugidani—Mt. Miyanoura-dake, Yakushima I., 29. vii. 1929, H. HORI lgt.

All the types including the holotype and allotype are deposited in the National Science Museum, Tokyo, except for a male paratype, which was collected by Mr. H. HORI in 1929 and is deposited in the Entomological Laboratory of Kyushu University.

Habitat: Japan (Yakushima I.).

Prismognathus angularis morimotoi subsp. nov.

Male. Differing from typical *angularis* in the following points: Mandibles similar in dentation to those of *angularis*, but the outer margin is less sinuate and the apex is more strongly bent inferiorly; punctuation stronger than in *angularis* and rather similar to that in *tokui* m.; posterior angles of pronotum more acute, with the outer margin distinctly emarginate and somewhat similar to that of *tokui*.

Length: 13.3–17.8 mm (without mandibles), 15.4–21.2 mm (with madibles); width: 5.8–7.2 mm

Female. Stands very closely by *tokui* m. in every point. The only point that separate *morimotoi* from *tokui* is the canthus not so strongly angulate.

Length: 14.6–17.0 mm (without mandibles), 15.6–18.4 mm (with mandibles); width

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6.0–7.3 mm.

Holotype (♂), allotopotype (♀) and paratopotypes: 6♂♂, 3♀♀, Mt. Aoi-dake, Miyazaki-Pref., S. Kyûshû., 7. viii. 1974, N. YOSHIDA lgt.

The holo- and allotopotypes and some paratopotypes are deposited in the National Science Museum, Tokyo, and some paratopotypes are deposited in the Kyushu Branch of the Government Forest Experiment Station, Kumamoto.

Habitat: Japan (South Kyûshû).

This race is something intermediate between *P. tokui* m. from the Island of Yakushima and *P. angularis* WATERHOUSE from northern Kyûshû and the other main islands of Japan, in the shapes of the mandibles and the pronotum and also in the female. I could examine the typical *angularis* collected at Mt. Unzen-dake, Nagasaki Pref. (1♂, 29. ix. 1974, N. YOSHIDA lgt.) and Mt. Hikosan, Fukuoka Pref. (1♂, 28. viii. 1950, K. YASUMATSU lgt. and 1♂, 24. viii. 1958, H. KUROKO lgt.). These mountains, both in northern Kyûshû, rise more than 1,000 m above the sea.

As stated in the description, *morimotoi* m. is something intermediate between *angularis* WATERHOUSE and *tokui* m. It may be assumed that such an intermediate condition was brought about by the hybridization between the ancestors of *angularis* and *tokui*.

The common ancestor of these three forms may have immigrated from the Continent in the early Pleistocene. In the following age, perhaps in an interglacial period, this ancestral species might be divided into the northern main type, the ancestor of *angularis*, and the southern insular form, the common ancestor of *tokui* and *morimotoi*, which remained in the area covering the hilly districts south of Miyazaki, the Ôsumi Peninsula, the Island of Yakushima, and the Island of Tanegashima. Then, the isolated race might be divided by some topographical barrier into two races in southern Kyûshû and Yakushima. In the recent glacial age, recombination of southern Kyûshû with the northern part caused a re-union of *angularis* with the northern race of *tokui*, which resulted in changing the latter into the present *morimotoi*. In the isolated island Yakushima, however, *tokui*, the most primitive form among the Japanese *Prismognathus*-species, still remains in the original style.

The fact that habitat of *morimotoi* is the hilly district lower than 600 m in altitude is very important. *P. angularis* is rather a subalpine species in northern Kyûshû, Shikoku and Honshû. The fauna of certain small islands around these main islands of Japan, e.g., Tobishima, Awashima, Sado, Izu Is., Okinoshima of Shikoku, etc., except for those in the Sea of Setonai-kai, contains some highland species, sometimes even subalpine species never found in the opposite part of the mainland, and in such small islands these species are sometimes found in lowlands or even at sea-level. That such highland species as *Strymonidia w-album fentoni* BUTLER (Lepidoptera, Lycaenidae), *Anoploderomorpha excavata* BATES (Coleoptera, Cerambycidae), etc. are found in southern Kyûshû may also be regarded as a proof that this area was an isolated island in recent geological age.

On the basis of these facts, it may be presumed that southern Kyûshû was united with northern Kyûshû after the formation of the Island of Yakushima. It is, however, not certain at which part was the the barrier between southern Kyûshû and the northern mainland.

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要　　約

従来，屋久島からオニクワガタ *Prismognathus angularis* WATERHOUSE として知られた種は，本州，四国などの高地に産し，北海道や樺太にも産する真のオニクワガタとは異なる別種であることを確認したので，新種ヤクシマオニクワガタ *Prismognathus tokui* Y. KUROSAWA として記載した．

一方宮崎県青井岳（563 m）で採集されたオニクワガタも北九州の長崎県雲仙岳，福岡県英彦山などの高所で採れた標本や，本州，四国，北海道など日本各地産の真のオニクワガタ *P. angularis* WATERHOUSE と見做される標本とは異り，♂♀共にオニクワガタとヤクシマオニクワガタの中間に位する形質を具えているので，オニクワガタの新亜種 *P. angularis morimotoi* Y. KUROSAWA として区別命名した．前者は採集者渡辺 徳氏，後者は標本提供者森本 桂博士にそれぞれ奉献された新名である．

日本におけるこれら 3 型の成因について考察してみると次の様になる．

洪積世の氷期に大陸から日本に侵入したこれら 3 型の祖型と思われる種類は，次の間氷期に北上したが，屋久島，種子島を含む南九州の一部は本土から隔離されたために，本土とは異るものとなった．さらに次の時代にはこの地域から少なくとも，現在の屋久島を含む地域は隔離された．やがて，次の氷期の訪れと共に南九州地域は再び北九州と連結し，北方からオニクワガタが侵入して来たので，在来種のヤクシマオニクワガタとの間に雑交が起り，現在の南九州亜種が生じた．しかし，この時屋久島はすでに島として形成されていたので，オニクワガタは侵入できず，ヤクシマオニクワガタは高所に追い上げられはしたが，そのまま屋久島特産種として残存した．他の種子島などのものは温暖化する気候に適応できず，逃避すべき高所もなく，絶滅したものであろう．ここに問題になるのは，南九州の産地が宮崎県青井岳の海抜 600 m にも満たぬ低山地である点である．これは極めて難かしい問題ではあるが，飛島，粟島，佐渡，伊豆諸島，四国沖の島など，瀬戸内海の諸島を除く本州，四国周辺の小島嶼の昆虫相がその対岸の本土の低地の昆虫相とは異って，主として，山地，時にはかなり高地の昆虫相と似通った種類が基盤をなし，それを暖地性昆虫相が覆っている事実，さらに島嶼ではこれら山地性の種類がかなりの低地，時には海岸近くまで発見される事実によって説明できるのではなかろうか．即ち，青井岳付近から大隅半島を経て種子島，屋久島へのびる地域が一つの島として本土から分離した時代があったのではないかと推定したい．上記オニクワガタを含めて，この地域にはカラスシジミ，ミヤマクロハナカミキリなど本州では寒冷地やかなりの高地に見られ，九州では他地域では見られない様な種類が意外に低地で発見される理由もこの辺にあるのではないかと推定される．

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Explanation of Plate 15

Three forms of Japanese *Prismognathus*

1–4: *P. tokui* Y. KUROSAWA, sp. nov.
5–8: *P. angularis morimotoi* Y. KUROSAWA, subsp. nov.
9–12: *P. angularis angularis* WATERHOUSE.
1, 5, 9: maximum phases; 2, 6, 10: medium phases; 3, 7, 11: minor phases;
4, 8, 12: females. 1 & 5: holotypes; 4 & 8: allotypes.

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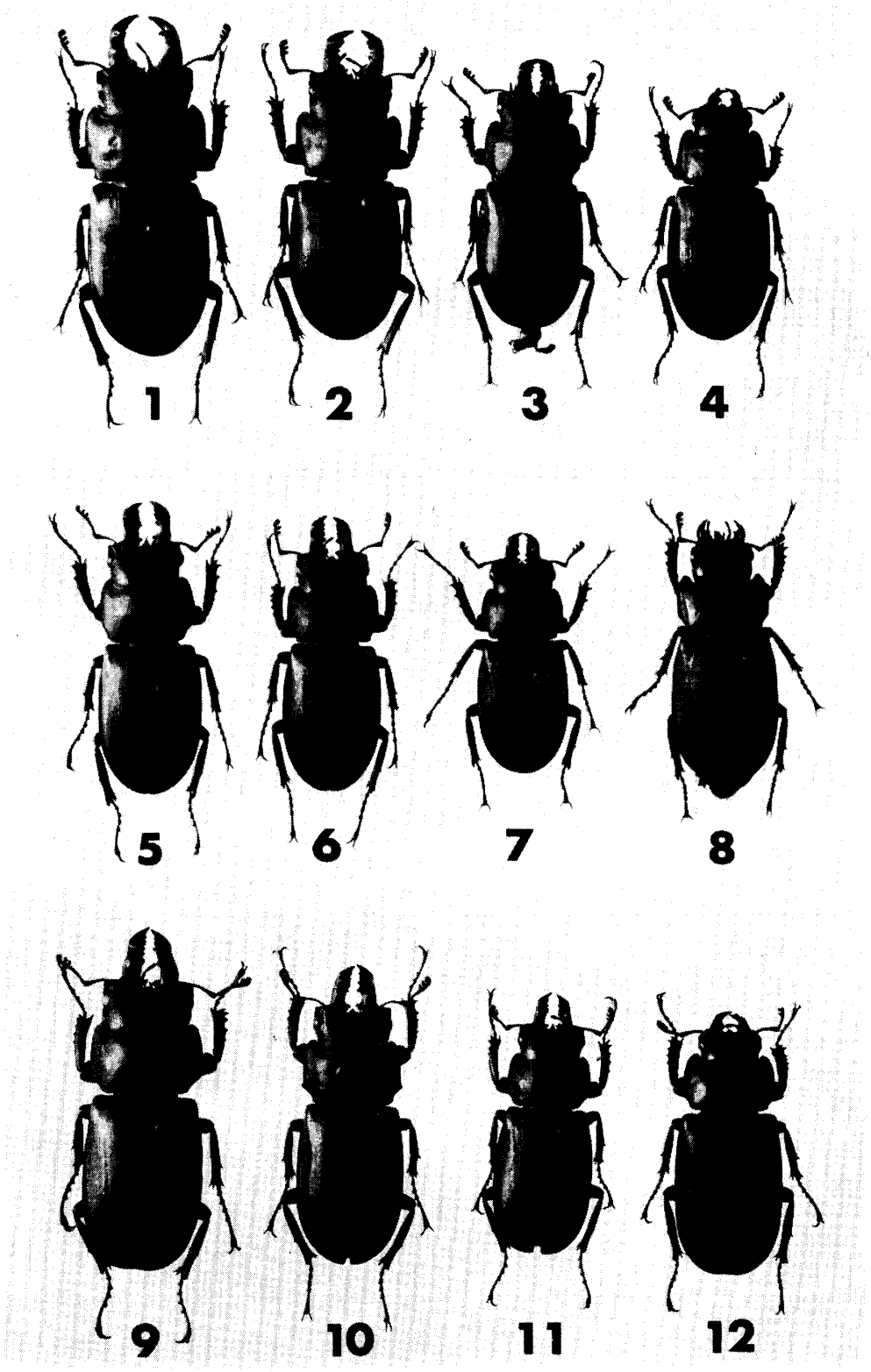

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